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Production and Operations Management

The Harbrace Series in Business and Economics

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Production and Operations Management

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Preface

This book is intended for an introductory course in production and operations management. The character of such an introductory course is currently a matter of some controversy. Production, of course, is one of the traditional functions or core areas of business management. The main issue in the controversy is the scope and depth of coverage that should be devoted to the quantitative techniques of operations research and management science. One argument is that the introductory production course should expose the student to operations research, with the emphasis on mathematical techniques and model building. This approach is intellectually sophisticated. However, because of the typical diversity in student backgrounds, mathematical maturity, and career objectives, a softer approach may be more in order. One such approach is to apply the quantitative techniques in the context of production problems and institutional or descriptive models. The term *operations management* connotes, in part, such an approach.

Production management, in some form, is a logical constituent of most engineering curricula. The question therefore arises whether this topic rightfully belongs within the less technical, business school curriculum. Although production has the connotation of being strictly an engineering function, managers make decisions about production matters using economic or even political criteria that are superimposed on the engineer's technological alternatives. There is a *technical* content to the managerial aspects of production management and decision making that is different from the technology of processing materials or providing services. It is this technical content that comprises the substance of business programs in general and production management in particular.

Also, consider the major management problems that exist in nonprofit public institutions and services, such as pollution control, public transportation, solid waste disposal, urban renewal, and hospital administration. These are large-scale systems problems that seem to defy easy formulation or orderly solution. There is a sense of urgency for their solution, and we need to formulate the content and structure of courses related to them. Here again is something that gives meaning to the words *operations management*. This text does more than just allude to these problems, for the reader will encounter a number of examples that have no relation to the traditional factory setting.

The organization of this book is primarily by problem or functional areas. A problem is presented, consideration is given to traditional approaches to it, and then the relevant quantitative techniques and related research are discussed. Many of the problems are tactical, the kind encountered at the "shop" level. This may disturb the student who is

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anxious to delve into those strategic kinds of problems that preoccupy "top" management. But there must be some substantive knowledge about production detail before one can grapple with policy matters. And more than one top manager has found it useful to be able to talk intelligently to those who must design, plan, and control the more detailed aspects of production systems.

This book is in a certain sense a survey of topics related to production and operations management. It does not exhaust the possible set of relevant topics, nor is any one topic dealt with in the depth required to attain proficiency. Footnotes and bibliographies direct the student to sources for greater penetration of specific topics. The range of topics presented is wide enough to allow the instructor latitude in structuring his course. He may choose to limit the number of topics he will discuss or to limit the depth of their coverage. The text will permit either possibility.

Chapters 1 through 3 are introductory. Chapter 3 discusses some of the conventional models used in production management. The intent is to describe how a model works, rather than to emphasize its mathematical development. This chapter can be used as a reference for later chapters where models are encountered in applications. Chapters 4 through 11 cover subjects that are basically related to the derivation of physical resources—facilities planning and design. Chapters 12 to 18 are mainly related to production planning and control—the management use of the physical resources.

Most chapters include case problems in the text around which the discussion of the substantive material can center. The use of the computer is an element of some of the cases and problems. A knowledge of computer programming, however, is not a requisite. For those students who are familiar with programming, the problems can be structured in the form of logic flow diagrams in varying degrees of detail and approaching programming format.

A survey of a field as dynamic and broad as production and operations management necessarily requires references to many sources of relevant material. Much of the quantitative discussion deals with the contributions of others to the field of management science. Thus I face the risk of omitting acknowledgments where they are rightfully due. Such omissions, if they have occurred, are not by design. The name Richard W. Conway of Cornell University threads its way through the footnotes. Because of my association with him, I am indebted to him for more than is accounted for. Henry P. Goode of Cornell University was kind enough to permit me to reproduce certain of his notes and original class problems. Martin K. Starr of Columbia University, Michael P. Hottenstein of Pennsylvania State University, and Yu Sang Chang of Boston University made many valuable comments and suggestions. Edward J. Carstens of the Eastman Kodak Company contributed some problems and suggestions, and graduate students Paul Brands, Barry Florescue, and Brian Pecon did work that ended up in certain pages of the text. Finally, I am grateful to the editors of *The Journal of Industrial Engineering, Management Science*, and *Operations Research*, as well as others, for permission to reprint and, of course, to the authors whose contributions are reprinted. Without their efforts one might truly question the justification of an academic pursuit of our subject.

J. WILLIAM GAVETT

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